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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,994	07/24/2003	Curtis B. Robinson JR.	386168016US	4169

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EXAMINER

LAXTON, GARY L

ART UNIT

PAPER NUMBER

2838

DATE MAILED: 10/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/626,994

Applicant(s)

ROBINSON, CURTIS B.

Examiner

Gary L. Laxton

Art Unit

2838

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/28/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the inductive booster providing the output of claim 7 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement

Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "said reference resistor" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "said output" in line 2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 and 3-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art figure 1 (APA fig 1) in view of Hugel et al (US 5,886,581).

Claims 1 and 3-8; APA fig 1 discloses a method of controlling the output voltage of a voltage regulator by measuring an output voltage and comparing the output voltage to a reference voltage in order to calculate the voltage error difference and to stop a charging process by controlling a power switch in response to the error voltage when the error signal is the same as the reference voltage. The regulator also uses a transformer to provide the output voltage.

However, APA fig 1 does not disclose measuring a voltage representative current of the output; comparing the voltage representative current to a reference current; and stopping a charging process of the voltage regulator when the voltage representative current of the output is substantially the same as the reference current.

Hugel et al teach a voltage regulator (30) using a transimpedance amplifier (24) for calculating a current error signal based on a current measurement (22) to control the voltage regulator based on the current error signal. Furthermore, Hugel et al teach that conventional amplifiers incur DC offset and temperature drifts problems and Hugel et al teach providing current feedback to the input of a transimpedance amplifier to overcome these problems (col. 1 lines 34-36).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the regulator circuit of the APA fig 1 to include a transimpedance amplifier in the regulator circuit and to measure a voltage representative current of the output; comparing the voltage representative current to a reference current; and stopping a

charging process of the voltage regulator when the voltage representative current of the output is substantially the same as the reference current.

Claims 9-11; APA fig 1 discloses a voltage regulator operative to monitor an output voltage on an output, the voltage regulator comprising: voltage comparator having a reference input and a sense input, the sense input connected to the output through a resistor or resistor divider, the comparator indicating that the output voltage is nominal when the sense input and the reference input are in a predetermined relation.

However, APA fig 1 does not disclose the comparator being a transimpedance block.

Hugel et al teach a voltage regulator (30) using a transimpedance amplifier (24) for calculating a current error signal based on a current measurement (22) to control the voltage regulator based on the current error signal. Furthermore, Hugel et al teach that conventional amplifiers incur DC offset and temperature drifts problems and Hugel et al teach providing current feedback to the input of a transimpedance amplifier to overcome these problems (col. 1 lines 34-36).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the regulator circuit of the APA fig 1 to include a transimpedance block in the regulator circuit in place of the voltage comparator in order to overcome the DC offset and temperature drifts normally associated with voltage comparators as taught by Hugel et al.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art figure 1 (APA fig 1) and Hugel et al (US 5,886,581) in view of Wilcox et al (US 5,731,694).

Claim 2; APA fig 1 and Hugel et al disclose the claimed subject matter in regards to claim 1 except for the reference current is generated by the use of a voltage reference and a voltage to current converter.

Wilcox et al teach converting a voltage to a current by converting a voltage reference (37) into a current through a voltage to current converter (38, 38A) in order to compare a measured current ( $I_{FB}$ ) to a current reference (38A) which is derived from a reference voltage (37).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify APA fig 1 and Hugel et al to include a reference current that is generated by the use of a voltage reference and a voltage to current converter as taught by Wilcox et al in order to compare a measured current to a current reference which is derived from a reference voltage.

8. Claims 1 and 3-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art figure 1 (APA fig 1) in view of Kaminishi et al (US 5,777,507).

The APA fig 1 discloses the claimed invention except that the APA fig 1 uses a conventional voltage comparator to compare a measured output voltage from a resistance or a resistor divider and control the voltage regulator in response to the comparator instead of using a

transimpedance amplifier/block to compare a measured output current and control the voltage regulator in response to the transimpedance amp/block.

Kaminishi et al specifically teach (col. 11 lines 55-65) that a differential transimpedance amplifier, used for converting a current to a voltage, can be replaced by a differential amplifier which receives a voltage signal outputs inverting and non-inverting voltage signals. Therefore, Kaminishi et al is teaching that it is obvious to replace a differential amplifier (i.e. voltage comparator), that receives voltage signals as inputs, with a transimpedance amplifier/block that receives current signals as inputs. Thus, it is obvious to one having ordinary skill in the art that the two amplifiers are interchangeable; and it would be readily recognizable to one having ordinary skill in the art that when using one of the amplifiers voltage inputs may be required or when using the other amplifier current inputs would be required.

Therefore, it would have obvious to one having ordinary skill in the art at the time the invention was made to modify the APA fig 1 to replace the voltage comparator and voltage measuring circuit with a transimpedance amplifier and current measuring circuit as taught by Kaminishi et al since the two amplifiers and measuring circuits are interchangeable.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art figure 1 (APA fig 1) and Kaminishi et al (US 5,777,507) in view of Wilcox et al (US 5,731,694).

Claim 2; APA fig 1 and Kaminishi et al disclose the claimed subject matter in regards to claim 1 except for the reference current is generated by the use of a voltage reference and a voltage to current converter.



Wilcox et al teach converting a voltage to a current by converting a voltage reference (37) into a current through a voltage to current converter (38, 38A) in order to compare a measured current ( $I_{FB}$ ) to a current reference (38A) which is derived from a reference voltage (37).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify APA fig 1 and Kaminishi et al to include a reference current that is generated by the use of a voltage reference and a voltage to current converter as taught by Wilcox et al in order to compare a measured current to a current reference which is derived from a reference voltage.

10. Claims 1 and 3-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art figure 1 (APA fig 1) in view of Baker (US 5,493,211).

The APA fig 1 discloses the claimed invention except that the APA fig 1 uses a conventional voltage comparator to compare a measured output voltage from a resistance or a resistor divider and control the voltage regulator in response to the comparator instead of using a transimpedance amplifier/block to compare a measured output current and control the voltage regulator in response to the transimpedance amp/block.

Baker teaches (col. 7 lines 5-10) that in the case in which the output signal of the converter is a current signal, it is not essential to the invention that a voltage signal be developed by use of a differential scaling amplifier to detect the voltage drop across a termination resistor, since a transimpedance amplifier may be used instead to develop a voltage output signal in response to a current input signal (emphasis).

Therefore, Baker is teaching that it is obvious to replace a differential amplifier (i.e. voltage comparator), that receives voltage signals as inputs, with a transimpedance amplifier/block that receives current signals as inputs. Thus, it is obvious to one having ordinary skill in the art that the two amplifiers are interchangeable; and it would be readily recognizable to one having ordinary skill in the art that when using one of the amplifiers voltage inputs may be required or when using the other amplifier current inputs would be required.

Therefore, it would have obvious to one having ordinary skill in the art at the time the invention was made to modify the APA fig 1 to replace the voltage comparator and voltage measuring circuit with a transimpedance amplifier and current measuring circuit as taught by Baker since the two amplifiers and measuring circuits are interchangeable as specifically taught by Baker.

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art figure 1 (APA fig 1) and Baker (US 5,493,211) in view of Wilcox et al (US 5,731,694).

Claim 2; APA fig 1 and Baker disclose the claimed subject matter in regards to claim 1 except for the reference current is generated by the use of a voltage reference and a voltage to current converter.

Wilcox et al teach converting a voltage to a current by converting a voltage reference (37) into a current through a voltage to current converter (38, 38A) in order to compare a measured current ( $I_{FB}$ ) to a current reference (38A) which is derived from a reference voltage (37).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify APA fig 1 and Baker to include a reference current that is generated by the use of a voltage reference and a voltage to current converter as taught by Wilcox et al in order to compare a measured current to a current reference which is derived from a reference voltage.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L. Laxton whose telephone number is (571) 272-2079. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (571) 272-2084. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 10/18/04  
Gary L. Laxton  
Patent Examiner  
Art Unit 2838